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ABSTRACT

A complete campus building condition evaluation survey was conducted at the University of Georgia in 1989 and results for the housing department were analyzed. The survey design was based on a model developed by Harlan Bareither at the University of Illinois that separates building deficiencies into seven general headings. Data were collected at weekly meetings held for 3 hours each over several months. The dollar value of all necessary capital renewal and deferred maintenance work was estimated on a building by building basis. The total analysis of housing department buildings covered 47 buildings comprising over 2 million square feet. The estimate for each building was compared to the total replacement value of the building and the resultant percentage deficiency recorded. The final analysis found that: (1) roof and window replacements totaled almost $3 million; (2) new fixed equipment and elevators totaled almost $5 million; (3) plumbing and fire protection waste piping and sprinkler systems totaled almost $4.5 million; (4) replacement of heating, ventilating and air conditioning systems equipment and controls required over $18 million; and (5) new wiring and fire alarms needs were estimated to require $3 million. A conclusion notes that other colleges and universities may expect deficiency percentages similar to these and that the Bareither model was very thorough. (Contains 45 references.) (JB)

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ED 378 857

Results of the Housing Building Condition Evaluation Survey at the University of Georgia

(A Joint Venture Involving Housing,
Institutional Research and Planning,
and Physical Plant Departments)

Prepared for the Forty-Second Annual Conference
The Association of College and
University Housing Officers International
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Introduction

During the past decade, higher education literature has discussed the problem concerning funding difficulties for deferred maintenance and capital renewal projects for campus buildings and infrastructures. All authors suggest that each institution conduct an audit of its buildings, in order to establish the extent of the problem on each campus. This paper presents the results of a complete campus building condition evaluation survey conducted at the University of Georgia in 1989.

The University of Georgia Survey

A 1989 survey[1] by the National Association of College and University Business Officers (NACUBO) and the Association of Physical Plant Administrators (APPA) indicated that higher education buildings nationwide face a 60 to 70 billion dollar backlog of maintenance and repairs. This total was increased in May of 1990 to a value of 80 to 90 billion, when follow-up analyses identified additional requirements.[2] This amount represents an average deficiency of over 25% when expressed as a percentage of the total replacement costs, estimated at over 300 billion, of all campus buildings. As a Research (Carnegie category) Institution with more than 80% of its buildings older than 20 years, the University of Georgia would be expected to experience an even higher deficiency percentage, due to the increased level of sophistication of research building systems,

expanded usage of these facilities due to increased enrollments, and building age. The recent survey conducted by the University of Georgia confirms this condition, indicating a gross deficiency of over 29% of replacement costs for all 1,122 buildings carried on the University space inventory. Similarly, the gross deficiency percentage of Main Campus Housing Buildings was over 30%. The results of this survey are indicated in Table I.

Survey Instrument

The survey design is based on Dr. Harlan Bareither's deficiency model developed at the U. of Illinois, and separates building deficiencies into seven general headings. Weekly meetings, lasting about 3 hours each, were held over the course of several months to collect data. Representatives of Physical Plant, Institutional Research and Planning, and the Departments housed in each building estimated, on a building by building basis, the dollar value of all necessary capital renewal and deferred maintenance work. This amount was compared to the total replacement value of the building, and the resultant percentage deficiency was recorded. Since many institutions are funded on a formula basis using a similar percentage (i.e. capital renewal/deferred maintenance funded on a line item as a percentage of replacement cost), a direct comparison between actual funding percentage and deficiency percentage can be made. For example, the University of Georgia Resident Instruction

funding formula returns 3/4 of one percent of total replacement cost on a yearly basis. It takes no effort to see that a present deficiency of almost 30% is not going to be corrected by a yearly funding level of 0.75%. A sample of a specific building survey is included in Table II.

Survey Results

The Georgia Housing Department is responsible for forty-seven buildings on the main campus, with a total area of over two million square feet. A review of the summary sheet (Table III) for these Housing Buildings indicates several areas of significant deficiencies:

A. In category 30 - Exterior: roof and window replacements total almost 3 million dollars. (2 items)

B. In category 40 - New fixed equipment and elevators total almost 5 million dollars. (2 items)

C. In category 50 - Plumbing/Fire Protection: waste piping and sprinkler systems total almost 4.5 million dollars. (2 items)

D. In category 60 - Heating, Ventilating and Air Conditioning: replacement of systems, equipment and controls account for over 18 million dollars. (4 items)

E. In category 70 - Electrical: new distribution (wiring) and fire alarms total almost 3 million dollars. (2 items)

Implications for Housing Officers

A majority of Housing buildings nationwide would be expected to evidence high deficiency percentages similar to those discovered in the Georgia survey. Housing buildings are particularly affected by this capital renewal/deferred maintenance problem, since the appearance of these structures is important for recruitment and retention of students. Many housing facilities at Georgia were built without air conditioning in the 1950s and 60s; correcting this oversight accounts for a high percentage of the total deficiency. In addition, experts suggest that Housing buildings should be renewed on a ten-year cycle, which further exacerbates the problem.(3)

Housing Officers should consider performing a building evaluation survey to identify their exact deficiency needs, and then follow the guidelines proposed in the current literature. In late 1989, NACUBO, APPA and the Society for College and University Planning (SCUP) joined forces to recommend the following solution to the dilemma, based on financial equilibrium planning concepts:(4)

> - Sufficient "plant renewal" funds on an ongoing basis to keep the plant in good condition for its present use, based on facility subsystem life cycles. (1.5 to 2.5 percent of plant replacement costs for most institutions).
> - And sufficient "plant adaptation" funds on an ongoing basis to alter the physical plant for changes in use and changes in codes and standards, based on recent experience and judgment (0.5 to 1.5 percent of plant replacement costs at most institutions).
> - And sufficient "catch-up maintenance" funds over a short term period to bring the plant into

> reliable operating condition, based on a facilities audit".

Regardless of funding level, projects should be prioritized and scheduled over several fiscal years to achieve maximum efficiency and effectiveness. Predictive models, such as Cushing Phillip's formula approach[5], should be employed for this purpose.

Conclusion

The building condition evaluation survey described in this paper was based on the Bareither deficiency model. This assessment method is very thorough and is highly recommended for use by other institutions. However, this is not the only model available; others may be more appropriate for other institutions. Regardless of the model used, all Housing Officers should consider implementing an audit as soon as possible.

Finally, all members of the academy must be sensitive to these building issues, mundane as they may be, because we have failed in the stewardship of these facilities.[6] The President of the Carnegie Foundation reminded us recently why we must do better:

> The buildings we erect today also reflect our priorities as people. And as we invest in education - as we build our cathedrals of learning - we are, in fact, affirming the university as a place where civilization will be preserved, where learning will be highly prized, and where the potentialities of every student will be served.[7]

Footnotes

(1) Rush, Sean C. and Johnson, Sandra L. The Decaying American Campus - A Ticking Time Bomb. Alexandria, Va.:APPA, 1989.

(2) Schaw, Walter A. "APPA Fact File - Current Status of 'The Decaying American Campus'". Alexandria, VA:APPA, 1990.

(3) Reed, William S. "Private Institution Approaches". In Meyerson, Jowel W. and Peter M. Mitchell. Financing Capital Maintenance. Washington, D.C.:NACUBO, 1990.

(4) Dunn, John A. "Financial Planning Guidelines". In "Capital Renewal and Deferred Maintenance", Critical Issues in Facilities Management Series (No. 4). Alexandria, Va.: APPA, 1989. Dunn presented this summary information from the recently published NACUBO/APPA/SCUP Financial Planning Guidelines for Facility Renewal and Adaption. Ann Arbor:SCUP, 1989. For a good overall view of the problems faced by the academy see Harvey H. Kaiser, editor. "Planning and Managing Higher Educational Facilities", New Directions for Institutional Research. San Francisco: Jossey-Bass, 1989.

(5) The Phillips model is described in Kaiser, Harvey H. "Major Maintenance and Capital Renewal/Replacement Programs", in Dillow, Rex O. (ed) Facilities Management - A Manual for Plant Administration (2nd ed.). Alexandria, Va.: APPA, 1989.

(6) In the Executive Summary of Financial Planning Guidelines for Facility Renewal and Adaption, the only italicized sentence is "It has become clear that American higher education has failed in the stewardship of its facilities assets."

(7) Boyer, Ernest L. "Buildings Reflect Our Priorities". Educational Record, Winter 1989 (Special Reprint by A.C.E.), p. 27.

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- TABLE I - SUMMARY

BUILDING CONDITION SURVEY - UNIVERSITY OF GEORGIA

1. General	All Buildings	Housing Main Campus
Buildings	1,122	47
Gross Area (Sq. Ft.)	11,030,293	2,012,643
Replacement Cost	$1,089,276,974	$175,988,005

2. SURVEY RESULTS
(Bareither Deficiency Model)

Category	All Buildings Deficiency %	Housing Main Campus
10 - Foundations	.64	.21
20 - Superstructure	1.48	.83
30 - Exterior	2.44	3.05
40 - General	10.23	7.96
50 - Plumbing/Fire	3.86	4.68
60 - HVAC	7.64	11.03
70 - Electrical	3.04	2.39
80 - Total (Gross)	29.32%	30.15%

3. Gross Deficiencies ($): (Replacement Cost x Gross Deficiency %)

a) All Buildings: $1,089,276,974 x 29.32% = $319,366,226

b) Main Campus Housing Buildings: $175,988,005 x 30.15% = $53,045,534

TABLE II

BUILDING NAME	BRUMBY HALL
BUILDING NUMBER	2213
LOCATION	816B RESIDENTIAL UGA MAIN CAMPUS
DATE CONSTRUCTED	1966
GROSS AREA	207,162
EST. REPLACEMENT COST	20,716,200
EVALUATION DATE	1989 05 02

		EST CORRECTION COST	% OF EST REP COST
10	FOUNDATION		.0
11	CRACKED FOUNDATION		.0
12	APPARENT SETTLEMENT		.0
13	OTHER PROBLEMS		.0
20	SUPERSTRUCTURE	103,581	.5
21	BROKEN OR CRACKED WALLS	103,581	.5
22	ROOF SAGGING		.0
23	FLOOR MOVEMENT EXCESSIVE		.0
24	ROOF PONDS		.0
25	OTHER PROBLEMS		.0
30	EXTERIOR SKIN	683,635	3.3
31	NEEDS NEW ROOF	207,162	1.0
32	WINDOWS IN POOR CONDITION	310,743	1.5
33	TUCKPOINTING REQUIRED	62,149	.3
34	OTHER PROBLEMS	103,581	.5
40	GENERAL	1,325,837	6.4
41	INTERIOR NEEDS PAINTING	103,581	.5
42	NEEDS NEW FLOORING	103,581	.5
43	NEEDS NEW CEILING	103,581	.5
44	INTERIOR WALLS NEED REALIGN		.0
45	NEEDS NEW FIXED EQUIPMENT	207,162	1.0
46	EXITS AND STAIRWAYS	103,581	.5
47	ENTRY RAMP		.0
48	ELEVATOR	621,486	3.0
49	OTHER PROBLEMS		.0
49A	ASBESTOS	82,865	.4
50	PLUMBING & FIRE PROTECTION SYS	1,035,810	5.0
51	FIXTURE REPLACEMENT	207,162	1.0
52	NEEDS NEW WASTE AND VENT	207,162	1.0
53	WATER LINE CAPACITY INADEQUATE	207,162	1.0
54	SPRINKLER SYSTEM	414,324	2.0
55	HANDICAP ACCESS - TOILETS		.0
56	OTHER PROBLEMS		.0
60	HEATING, VENTILATION & AC SYS	372,891	1.8
61	HEATING	41,432	.2
62	VENTILATION	207,162	1.0
63	AIR CONDITIONING	103,581	.5
64	TEMPERATURE CONTROL	20,716	.1
65	OTHER PROBLEMS		.0
70	ELECT, FIRE ALARM & LIGHT SYS	298,026	1.4
71	CAPACITY	20,716	.1
72	DISTRIBUTION	41,432	.2
73	FIXTURES	20,716	.1
74	FIRE ALARM SYSTEM	207,162	1.0
			.0

TABLE III

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INSTITUTIONAL RESEARCH AND PLANNING

BUILDING CONDITION EVALUATION SUMMARY | PAGE 1

BUILDING NAME: TOTAL
LOCATION: 816B RESIDENTIAL UGA MAIN CAMPUS
CONSTRUCTION DATE: ALL
EVALUATION DATE: ALL

		EST CORRECTION COST	% OF EST REP COST
10	FOUNDATION	366,189	.21
11	CRACKED FOUNDATION	28,670	.02
12	APPARENT SETTLEMENT	202,022	.11
13	OTHER PROBLEMS	135,497	.08
20	SUPERSTRUCTURE	1,458,304	.83
21	BROKEN OR CRACKED WALLS	1,089,605	.62
22	ROOF SAGGING		.00
23	FLOOR MOVEMENT EXCESSIVE	51,456	.03
24	ROOF PONDS	25,881	.01
25	OTHER PROBLEMS	291,362	.17
30	EXTERIOR SKIN	5,361,142	3.05
31	NEEDS NEW ROOF	873,724	.50
32	WINDOWS IN POOR CONDITION	2,929,478	1.66
33	TUCKPOINTING REQUIRED	211,507	.12
34	OTHER PROBLEMS	1,346,441	.77
40	GENERAL	14,003,567	7.96
41	INTERIOR NEEDS PAINTING	1,495,501	.85
42	NEEDS NEW FLOORING	1,681,442	.96
43	NEEDS NEW CEILING	1,253,607	.71
44	INTERIOR WALLS NEED REALIGN	879,063	.50
45	NEEDS NEW FIXED EQUIPMENT	2,324,083	1.32
46	EXITS AND STAIRWAYS	1,140,347	.65
47	ENTRY RAMP	188,271	.11
48	ELEVATOR	2,413,911	1.37
49	OTHER PROBLEMS	1,260,708	.72
49A	ASBESTOS	1,366,634	.78
50	PLUMBING & FIRE PROTECTION SYS	8,239,761	4.68
51	FIXTURE REPLACEMENT	1,466,137	.83
52	NEEDS NEW WASTE AND VENT	2,033,519	1.16
53	WATER LINE CAPACITY INADEQUATE	1,409,534	.80
54	SPRINKLER SYSTEM	2,370,178	1.35
55	HANDICAP ACCESS - TOILETS	309,432	.18
56	OTHER PROBLEMS	650,961	.37
60	HEATING, VENTILATION & AC SYS	19,413,013	11.03
61	HEATING	4,415,288	2.51
62	VENTILATION	5,570,283	3.17
63	AIR CONDITIONING	6,466,438	3.67
64	TEMPERATURE CONTROL	1,716,384	.98
65	OTHER PROBLEMS	1,244,628	.71
70	ELECT, FIRE ALARM & LIGHT SYS	4,203,567	2.39
71	CAPACITY	751,532	.43
72	DISTRIBUTION	1,993,959	1.13
73	FIXTURES	456,286	.26
74	FIRE ALARM SYSTEM	883,764	.50
75	OTHER PROBLEMS	118,026	.07
80	TOTAL BUILDING DEFICIENCY	53,045,539	30.14

NUMBER OF BUILDINGS: 47
GROSS AREA: 2,012,643